Small Gas Engine Construction and Operation

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Introduction

This video will explain the construction and operating principles of typical small gas engines. You will learn about the differences between two-stroke and four-stroke cycle engines. This program will discuss the major components that make up these particular engines. You will also learn about the various systems that enable small gas engines to operate. These systems include: the fuel system, the ignition system, the lubricating system and more. In the final section of this tape, you will discover that there are several ways of classifying these small "power plants. " The purpose of this program is to provide you with a basic understanding of small gas engine fundamentals. This will allow you to comprehend the engine troubleshooting and repair techniques presented in later videos.

Student Objectives

After viewing this video, you will be able to:

List the basic parts of a small gas engine.
Describe the function of each basic component of a small gas engine.
Explain the differences between a two-stroke and a four-stroke cycle engine.
Name the strokes of a four-stroke cycle engine.
Explain the sequence of events during each stroke of a four- stroke cycle engine.
Describe how a "reed valve" operates in a two-stroke cycle engine.
Explain the term "gravity feed."
Describe the basic operation of a small gas engine fuel system.
Explain the basic operation of a small gas engine ignition system.
Describe several ways to classify small gas engines.

To The Instructor

This video is designed to be a valuable supplement to your curriculum. Since young people are extremely acclimated to television, it is a natural way to help present important aspects of your subject matter. This video is designed to give a detailed, yet broad coverage of the topic.

Most educators agree that it is best to use as many instructional methods as possible. Utilise quality textbooks, workbooks, videos, lectures, demonstrations, overheads, and other methods to present the technical information. This will hold interest and help pupils understand the large amount of information required to succeed in today's complex world.

This video is organised into major sections or topics. Each section covers one major segment of the subject Graphic breaks are given between each section so that you can stop the video for class discussion, to answer critical questions, to ask questions or perform in-class demonstrations with actual components or parts. This program's format is arranged to be extremely flexible. View it as a full length program, a supplement for lectures, or demonstrations for self-paced individualised instruction.

This video allows you to watch only a portion of the program each day or the complete video, depending on your curriculum requirements

The program is designed to simplify the complex. Concise wording and carefully selected graphics are used to provide maximum learning in minimum time.

Close-up shots of components and service procedures are used to make every second of viewing instructional, as if each student was standing right behind you, watching over your shoulder while you were working or giving a demonstration. Our technical visual images are designed to match the audio so that every scene has maximum educational value.

Computer animation is used to explain difficult to comprehend principles or techniques. Students seem to enjoy the cartoon type images that show how parts work, how they fit together, or how they vary in design.

Quiz Answer Key

1. b 2. d 3. a 4. b 5. c 6. d 7. a 8. c 9. c 10. b 11. a 12. c 13. d 14. a 15. b

Use your own judgement to evaluate the definitions, definition type questions, and discussion topics.

Technical Terms

Write definitions for the following terms. Use a textbook or review the video if needed.

reciprocating piston engine, combustion chamber, piston, piston rings, connecting rod, crankshaft journal, rod journal, flywheel, engine cylinder, crankcase, valve train, lifter, push rod, poppet valve, valve seat, intake stroke, compression stroke, power stroke, exhaust stroke, four-stroke cycle engine, two-stroke cycle engine, reed valve, intake valve, exhaust valve, fuel system, carburettor , engine governor, centrifugal force, ignition system, contact points, condenser, ignition coil, magnetic field, electronic ignition system, electronic ignition module, valve guides, cylinder head, head gasket, intake manifold, exhaust manifold, rod cap, valve face, valve springs, valve seals, overhead valve engine, valve stem, rocker arm, camshaft, cylinder block, horizontal engine, vertical engine, air cooled engine, liquid cooled engine, friction bearings, anti-friction bearing, press-fit piston pin, floating piston pin, flat head engine, electronic fuel injection, LP gas fuel system

Video Discussion Topics

Here are a few topics that might be used for a class discussion.

1. Name the basic parts of a small gas engine.

2. Explain the major differences between a two-stroke and four- stroke cycle engine.

3. What is the purpose of a choke on a small gas engine?

4. How does a small engine's "air-vane" governor operate?

5. Describe the basic operation or a small gas engine's electronic ignition system.

6. How does a "gravity feed" carburettor normally operate?

7. Name the basic parts of a small engine's "reciprocating assembly."

8. List some of the similarities between an automobile engine and a four-stroke lawnmower engine.

Video Quiz

Print the appropriate letter in the blank to indicate the most correct answer after reading the statement:

I. A heavy _____ allows a small gas engine's crank- shaft to rotate smoothly.
a. bolt b. flywheel c. washer d. flange

2. Piston rings are used in a small engine to prevent _____ leakage between the piston and cylinder wall.
a. coolant b. exhaust c. gas d. pressure

3. Which of the following systems regulates the flow of a small engine's fuel mixture and burned exhaust gases?
a. Valve train system b. Ignition system c. Injection system d. EGR system

4. In a four-stroke engine, _____ events occur to complete one cycle.
a. two b. four c. eight d. three

5. During the compression stroke, the _____ slides up with both valves closed to squeeze the fuel mixture.
a. cam b. lifter c. piston d. crankshaft

6. A two-stroke cycle engine produces power on every _____ piston movements .
a. six b. four c. eight d. two

7. A two-stroke engine's _____ port allows an air, fuel and oil mixture to be pulled into the combustion chamber when the piston slides down.
a. transfer b. exhaust c. oil d. plug

8. During a four-stroke cycle engine's _____ the burned gases are pushed out by the upward moving _____ .
a. intake, cam b. exhaust, valve c. exhaust, piston d. compression, piston stroke,

9. When air flows through a(n) _____ , it pulls liquid fuel out of the bowl and nozzle.
a. injector b. manifold c. carburettor d. port

10. Older small engine ignition systems use contact points and a _____ to trigger the coil to produce high voltage .
a. magnet b. condenser c. transformer d. module

11. The purpose of a small gas engine's _____ system is to start combustion in the combustion chamber.
a. ignition b. injection c. intake d. carburettor

12. A small engine's cylinder _____ is often a removable lid mounted on the top of the engine cylinder.
a. shroud b. plate C. head d. cover

13. The oil ring used in a small engine must force excess oil through a hole in the._____ so that the oil can return back down into the crankcase.
a. crankshaft b. camshaft c. rod d. piston

14. The _____ end of a small engine's connecting rod bolts around the crankshaft.
a. large b. aluminium c. small d. short

15. In most small engine designs, the _____ mounts in the crankcase next to the crankshaft
a. lifter b. camshaft c. breather d. piston

Short Answer

Briefly answer the following questions in your own words:

I. Why are most small gas engines termed "reciprocating piston engines?"

2. What position is the exhaust valve in during a four-stroke engine's "intake stroke?"

3. Describe how a "reed valve" normally operates in a two-stroke engine.

4. Do all small gas engines use "gravity feed" fuel systems?

5. Where is a small engine's air cleaner normally mounted?

6. Why is a "governor" used on a small gas engine?

7. What is used to prevent pressure leakage between a small engine's cylinder head and block?

8. What is the function of a small engine's camshaft?

9. What is the most common small gas engine "cylinder arrangement?"

10. Name two types of lubrication systems used on small engines.

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